USGS

# WATER RESOURCES RESEARCH GRANT PROPOSAL

**TITLE:** Value Assessments in Surface Water Transfer: Deterministic and Stochastic Issue for Buyer, Seller and Third Parties

**DURATION:** October 1, 1997 - August 31, 2000

**FEDERAL FUNDS REQUESTED:**$115,064

**NON-FEDERAL MATCHING FUNDS PLEDGED:**

$20,000 CASH $214,605 IN-KIND

**PROJECT CO-DIRECTORS:** David Eaton, University of Texas at Austin

Al Utton, The University of New Mexico

Peter Wilcoxen, The University of Texas at Austin

**CONGRESSIONAL DISTRICT OF LEAD INSTITUTION:** Texas: 14th

**STATEMENT OF CRITICAL REGION OR STATE WATER PROBLEMS:**

Water market transactions can serve both public and private interests. For example, water markets can increase access to water supplies where fully allocated or during drought periods. Markets also provide incentives for water conservation and promote technical and economic efficiency. Despite these benefits, water markets have been slow to develop. Many practicing water managers have come to realize that one explanation is that buyers and sellers have a difficult time valuing water under variable cond itions of water supply and there is not much clarity about how to identify third party effects or decide whether or how to compensate interests that might lose as the result of water transfers. This project addresses: l) the problem of valuing third party effects; 2) the need to incorporate stochastic variables related to availability and quality in water supply appraisals; and 3) the need to deal explicitly with uncertainties in the interpretation of value estimates. Guadalupe-Blanco River Authority (GBR A), a large public utility with responsibilities for water resources management and planning in a ten-county area of central Texas, will participate in this project. The agency is currently dealing with significant water marketing issues and could benefit from the development of improved techniques for valuation of water supplies.

State water regulators are asked increasingly to consider external effects during administrative review of proposed water transfers. Few methods are available to accomplish this task. Methods of evaluating economic cost and benefit to third parties may not be "standard" and do not always satisfy the information needs of those making decisions about whether or not to allow a transfer. Therefore, this project will consider

"operational" measures of cost and benefit as an alternative to economic valuation where appropriate. Transfer decisions are further confounded by deterministic presentations of cost and benefit. In most empirical estimates of water value, there is no accounting for the risks faced by buyers, sellers and third parties related to uncert ainties of flows or future streamflows following the stochastic pattern of historical flows, even though benefits and costs change with altered patterns and characteristics of water supply. Stochastic variables that contribute to uncertainty in estimates of water values affect accessibility, reliability, timing and quality of water. In theory market participants may internalize consideration of risk and uncertainty in evaluating costs and benefits; in practice the failure to consider risks in empirical va luation of water may be an impediment to market activity. It is not enough to identify the sources of uncertainty. Water supply appraisals should also incorporate information about the levels of sensitivity and the degree of uncertainty in value estimates . This project will addresses all three issues with respect to specification of input variables and estimation of water values.

**STATEMENT OF RESULT OR BENEFITS:**

Results of this research will contribute to making water markets a mow transparent, defensible, and implementable tool of water management. Investigators foresee several useful results including a comprehensive review of water market operations in all of the Western States, with a focus on methods used to evaluate and appraise water supplies, third party effects, sensitivity and uncertainty in water valuations, as well as environmental, social, and recreational effects dependent upon access to water or the presence of in-stream flows.

· methods to appraise water supplies using economic and "operational" values;

· methodology to evaluate, quantify and analyze third party effects;

. a methodology to analyze sensitivity and uncertainty in water valuations;

· methods of non deterministic water valuation that incorporate information about stochastic variables affecting supply condition and uncertainty, and

· methods of representing variability and uncertainty in water supply appraisal and water transfer evaluations.

This research combines conventional and innovative methods to address a question of practical importance to water managers. The information dissemination component of this project includes development and implementation of a workshop to train water man agers in practical applications of water valuation techniques. Publication of a manual for evaluating the benefits and costs of water transfers and publication of workshop materials for training water managers is planned. An emphasis on methodological iss ues that address problems in water valuation and water transfers in all of the Western states

ensures that results of this project will be applicable throughout the western United States.